NOTES ON THE DISTRIBUTION OF CERTAIN RARE, ENDANGERED OR ENDEMIC PLANTS OF MEGHALAYA WITH A BRIEF REMARK ON THE FLORA[1]

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Introduction

In India, as elsewhere, the main causes for disappearence or threat to species are deforestation, afforestation with single species, and introduction and spread of foreign weeds (Rao 1979). With the disturbance of the natural habitat, a large number of species are threatened with extinction in India. A preliminary list of such endangered or threatened plants of the country has been recently compiled by Jain and Sastry (1980). Disturbance or clearence of natural vegetation in Meghalaya has especially rendered a large number of species rare or endangered, which were otherwise quite common at a time, when Flora of British India (Hooker 1872-97) was compiled. Recent studies by us on the flora of Meghalaya reveals a large number of such rare species with limited distribution in the state. Most of these species have not been reported by Jain and Sastry (op. cit.), and are therefore enumerated in this paper.

Location and general features of vegetation of Meghalaya

The state of Meghalaya lies between 25° 47′ and 20° 10′ N and 89° 45′ to 92° 47′ E in north-east India. The topography of the region is remarkable with undulating hills and steep slopes dissected by a network of rivers and their tributaries. These hills constituting the Sub-Himalayan ranges have access to the Himalayas, south China, Malay Peninsula through Burma and to Peninsular India. This has resulted in an astonishingly high floristic diversity.

The vegetation of Meghalaya has been categorised under the tropical and temperate types (Rao and Panigrahi 1961, Rao 1974). The tropical vegetation is confined to elevations up to 1800 m and comprises of (a) tropical evergreen and semievergreen forests along the high rainfall area of the southern belt (b) tropical deciduous forests occupying a major portion of the state and include such economically important species as *Tectona grandis, Shorea robusta, Pterocarpus marsupium* and others (c) subtropical pine forests (with *Pinus kesiya*) as the chief element over the high altitudes of Khasi and Jaintia hills.

The temperate forests in Meghalaya are chiefly confined to elevations between 1800 m to 1950 m. The dense patch of ‘Sacred forests’ at Shillong Peak and Mawphlang represent the true temperate forests, which show a high percentage of Himalayan elements. These sacred forests which are almost untouched due to religious beliefs represent the relict flora of the region and now act as sanctuaries for most of the rare, endangered or endemic plant species, which could have been probably fairly well distributed at one time.

The forests, in Meghalaya, have suffered

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heavy deforestation, mainly due to the evil practice of the so called 'jhumming' or shifting agriculture, which involves cutting down and burning of forests for agriculture for a period of 2 or 3 years and then following the area. In fact it can be said that there is hardly any area in Meghalaya which has not been jhummed at one time or other (except the sacred forests), with the result that the once luxuriant forest covered hills in the state, are now turned to grasslands and barren areas (Rao 1979). Comparative studies on the vegetation of sacred forests with that of adjacent areas can give us an indication of the extent to which the original forests might have been disturbed. Thus, deforestation in Meghalaya has resulted in the disappearence or has made rare a number of taxa. Such rare or threatened plants are now confined only to some sacred forests or to small, comparatively less disturbed pockets of vegetation in the state.

ENUMERATION OF RARE, ENDANGERED OR ENDEMIC PLANTS OF MEGHALAYA

The paper reports 70 species which are either rare, endangered or endemic in Meghalaya along with their habit, previous distribution and present occurrence in Meghalaya.

In the following enumeration of rare, endangered or endemic plants of Meghalaya, the species are alphabetically arranged. Categories[3] or status of taxa like Rare (R), endemic (E), endangered (EN) and vulnerable (V) are indicated and this is abbreviated as shown. Then follow the name of the family to which the species belong. This is followed by brief notes on distribution in India and in Meghalaya; and citation of voucher specimens, which are deposited in the Herbarium, North-Eastern Hill University, Shillong (NEHU[4]).

Acer laevigatum Wall. (R) (ACERACEAE).

Trees; Temperate Himalayas from Shillong Simla to Khasi hills; now confined only to sacred forests of Shillong peak and Mawphlang in Meghalaya. *Haridasan* 2393.

Agapetes obovata Hk. f. (V) (VACCINIACEAE)

Epiphytic shrubs; Khasi hills. Presently this species is confined only to sacred groves of Shillong peak, Mawphlang and Mawsmai. *Haridasan* 10005.

Apios carnea Benth. (R) (FABACEAE)

Twiners; Nepal and Khasi hills. We have recorded this only from Laitkor and Shillong peak forests. *Haridasan* 2395.

Apodites benthamiana Wt. (V) (OLACINACEAE)

Trees; Hooker reports this from western peninsula, Nilgiris and Meghalaya. We have noted this only from Mawlai in Khasi hills. *Haridasan* 5271.

Artocarpus lakoocha Roxb. (E) (MORACEAE)

Deciduous trees, throughout the north-east India, tropical Himalaya and Burma; we have recorded this only from Baghmara and Damra of Garo hills. *Haridasan* 4620.

Baliospermum micranthus Muell.-Arg. (V) (EUPHORBIACEAE)

Small trees; Hooker reports this from Khasi and Jaintia hills; presently confined to sacred forests of Mawsmai only. *Haridasan* 2898.

Berchemia floribunda Wall. ex Brandis (R) (RHAMNACEAE)

Shrubs; Tropical himalayas, East Bengal and Khasi hills (Hooker 1872-97). Very rare in Meghalaya, collected only once from Mawlai. *Haridasan* 5272.

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[3] The definitions for these various categories have been provided by Jain and Sastry (op. cit.).

[4] The abbreviation 'NEHU' is yet to find a place in 'Index Herbariorum'.

Butea monosperma (Lam.) Taub. (V) (FABACEAE)

Trees; Common throughout India and Burma extending to Malaya. Confined to Garo hills in Meghalaya; the population of this species has been considerably reduced. *Haridasan* 2799.

Campanumoea javanica Bl. (V) (CAMPANULACEAE)

Twiners; Sikkim and eastwards to Burma and Java; now only recorded from Shillong, Nongstoin and Jowai. The population of this species is considerably reduced. *Haridasan* 3391.

Cardamine impatiens L. (R) (BRASSICACEAE)

Herbs; Temperate Himalayas, Sikkim to Bhutan; Asia and Europe. Collected only once in Shillong, very rare. *Haridasan* 4600.

Chirita hamosa R. Br. (E and EN) (GESNERIACEAE)

Herbs; Hooker records this from Khasi hills, Burma and Malaya. Very rare in Meghalaya and the present report forms the second report from this region; confined to limestone forests of Balphakram in Meghalaya. *Haridasan* 10067.

Clerodendrum hastatum Lindl. (EN) (VERBENACEAE)

Shrubs; Khasi hills and Sylhet (Hooker 1872-97); we have recorded this only once from Umsemlem. *Haridasan* 4568.

Coldenia procumbens L. (R) (BORAGINACEAE)

Herbs; Throughout Tropical India, Africa, Asia and Australia; but we have recorded only once as a weed in paddy fields at Baghmara of Garo hills. *Haridasan* 2796.

Connarus paniculatus Roxb. (V) (CONNARACEAE)

Trees; Sylhet and Khasi hills; now confined to Sacred forests of Mawsmai only; the population of this species has considerably reduced. *Haridasan* 4796.

Corylopsis himalayana Griff. (V) (HAMAMELIDACEAE)

Shrubs; Khasi hills, Bhutan and S. China; now the population of this species has considerably reduced and is found along a narrow belt in the eastern part of the state. *Haridasan* 10253.

Dalhousiea bracteata Grah. (R) (FABACEAE)

Scandent shrubs; Eastern Himalaya, Assam and Sylhet. In Meghalaya very rare and collected only from Umtesar, Khasi hills. *Haridasan* 4684.

Daphniphyllum himalayense Muell.-Arg. (EN) (DAPHNIPHYLLACEAE)

Trees; Temperate Himalaya, Mishmi hills and Sikkim and Khasi hills. We have recorded this only from the sacred groves at Shillong Peak, Mawsynram and Mawphlang; another species with a decreased population. *Haridasan* 4791.

Dipsacus asper Wall. ex DC. (V) (DIPSACACEAE)

Herbs; Khasi hills; now the population of this species in Meghalaya is highly reduced. *Haridasan* 3392.

Elaeocarpus acuminatus Wall. ex Mast. (R) (ELAEOCARPACEAE)

Trees; East Bengal and Assam and Khasi hills; we have collected this only from sacred forests of Shillong Peak. The population of this species has also been reduced considerably. *Haridasan* 4297.

Elaeocarpus prunifolius Wall. ex Mast. (R) (ELAEOCARPACEAE)

This has been recorded from Sylhet and Khasi hills; but now it is seen only in sacred forests near Jarain in Jaintia hills. *Haridasan* 2055.

Endospermum chinense Benth. (V) (EUPHORBIACEAE)

Trees; Kanjilal *et al.* (1934-40) report that this is very common throughout the province; but now it is very rarely met with along the banks of rivers near Lailad, Khasi Hills. *Haridasan* 5296.

Engelhardtia wallichiana Lindl. (R) (JUGLANDACEAE)

Trees; Khasi and Jaintia hills; Now only few trees are noticed in Lailad of Khasi hills. *Haridasan* 3396.

Epipogeum roseum Lindl. (R) (ORCHIDACEAE)

Saprophytic orchids; Tropical Himalayas, Nepal, Sikkim and Khasi hills. In Meghalaya, extremely rare and we have collected this only once near Nongpoh. *Haridasan* 5281.

Erycibe peguensis Roxb. (R) (CONVOLVULACEAE)

Large climbers; Throughout India, Himalayas, Malaya and Australia; But we have collected this only from Mahadeo in Garo hills. *Haridasan* 4175.

Euonymus bullatus Wall. ex Lindl. (EN) (CELASTRACEAE)

Small trees; Khasi and Jaintia hills; Now found only at sacred forests in Mawsmai. *Haridasan* 4664.

Fraxinus floribunda Wall. (V) (OLEACEAE)

Trees, Temperate and subalpine Himalayas (Hooker 1872-97); in the entire Meghalaya we have noticed only a couple of trees near Malki in Shillong. *Haridasan* 4548.

Galeola falconeri Hk. f. (R) (ORCHIDACEAE)

Parasitic orchids; subtropical Himalaya and Sikkim; in Meghalaya, extremely rare and collected only once in Tura peak. *Myrthong* 1841.

Gastrodia exilis Hk. f. (R) (ORCHIDACEAE)

Saprophytic orchids; Hooker (1872-97) reports this from Khasi hills; there are no collections of this in the Assam herbarium; our collections from Raliang sacred forest forms a second report from this region. *Haridasan* 3387.

Goniothalamus simonsii Hk. f. & Th. (R) (ANNONACEAE)

Small trees; Hooker reports this from Khasi hills. Presently it is restricted only to the Lailad area of Nongkyllem reserve forest in Meghalaya. *Haridasan* 10288.

Hedera helix L. (V) (ARALIACEAE)

Climbers; Khasi hills, Bhutan Himalayas; in the present Khasi hills the population of this species is getting reduced due to forest clearings. *Haridasan* 2400.

Hymenodictyon excelsum Wall. (R) (RUBIACEAE)

Trees; W. Himalaya, Nepal and Bangla Desh; we have recorded this only once in Tura peak. *Haridasan* 4621.

Ilex khasiana Purkaystha (V) (AQUIFOLIACEAE)

Trees reported from Khasi hills; now there are only a couple of trees in the Shillong peak and Elephant falls area. *Haridasan* 4799.

Ilex venulosa Hk. f. (R) (AQUIFOLIACEAE)

Another species reported from Khasi hills; now very rare in Khasi hills as its habitat near Laitlyngkot has been destroyed. *Haridasan* 3393.

Lasiobaema scandens (L.) de Wit (R) (CAESALPINIACEAE)

Lianas; Eastern Bengal, Sikkim, Burma and

Malaya. An extremely rare plant in Meghalaya; collected from Daveband, Maheshkola in Garo hills (only one plant was noticed). *Haridasan* 10099.

Leptodermis griffithii Hk. f. (V) (RUBIACEAE)
Shrubs reported from Khasi hills; presently it is seen only in Upper Shillong where it is facing extinction. *Haridasan* 2397.

Leucosceptrum canum Sm. (R) (LAMIACEAE)
Small trees; Temperate Himalaya, Bhutan and Khasi hills; presently confined only to some pockets in Shillong. *Haridasan* 4598.

Litsea elongata Wall. (R) (LAURACEAE)
Trees; Assam, Khasi and Jaintia hills; now mostly confined to sacred forests at Shillong peak and Mawphlang. *Haridasan* 2394.

Manglietia insignis Bl. (R) (MAGNOLIACEAE)
Trees; Nepal and Khasi hills; presently the species is confined only to sacred forests in Meghalaya. *Haridasan* 2396.

Medinilla rubicunda Bl. (V) (MELASTOMACEAE)
Epiphytic shrubs; sub-Himalayan ranges, Sikkim eastwards to Khasi hills. Now restricted only to sacred forests in Meghalaya. *Haridasan* 4300.

Meliosma pinnata Roxb. (R) (SABIACEAE)
Trees; Sikkim, Himalayas and Khasi hills; the only collection we have is from Shillong Peak, where a solitary tree exists. *Haridasan* 4218.

Melodorum rubiginosum Hk. f. & Th. (E) (ANNONACEAE)
Climbers; Assam, Sylhet and Burma; only present in Rongrengiri Reserve forest of Garo Hills, where the population of the species is highly reduced. *Haridasan* 9948.

Michelia punduana Hk. f. & Th. (R) (MAGNOLIACEAE)
Hooker and Thomson (1872) report this species from Khasi hills; we have not been able to collect anywhere in Khasi hills, but our collection is from Jaintia hills. *Haridasan* 2834.

Monotropa uniflora L. (R) (MONOTROPACEAE)
Saprophytic herbs; Temperate Himalayas, Khasi hills and Japan. Extremely rare in Meghalaya and found only in sacred grooves of Shillong peak and Mawphlang; this species is also at risk now. *Haridasan* 2399.

Munronia pinnata (Wall.) Harms. (R) (MELIACEAE)
Herbs, Eastern Himalaya, Sikkim, Khasi hills and Nilgiris. The population of this species is extremely low due to forest clearings. *Haridasan* 2791.

Nepenthes khasiana Hk. f. (E) (NEPENTHACEAE)
This is the pitcher plant of Meghalaya; one of the endemic plants struggling for survival in small pockets in Jarain, Maheshkola, and Baghmara and other places in the southern belt of the state. *Haridasan* 3398.

Ochna squarrosa Planet. (V) (OCHNACEAE)
Trees, Burma, Andamans and Khasi hills; very rare in Meghalaya and collected only from Balphakram sanctuary. *Haridasan* 947.

Parkia roxburghii A. DC. (R) (MIMOSACEAE)
Trees; Assam, Sylhet, Burma and Malay Peninsula. In Meghalaya very rare due to jhumming and indiscriminate felling; only few plants are noticed along the southern part of Garo Hills, Garampani and Nongpoh. *Haridasan* 4280.

Paurthiaea arguta Decne (R) (ROSACEAE)

Trees reported from Khasi hills; presently confined to Shillong peak only, where only a few trees are present. *Haridasan* 4529.

Pentapterygium rugosum Hk. f. (R) (VACCINIACEAE)

Epiphytic shrubs; Bhutan and Khasi hills; now confined to sacred forests in Khasi hills. *Haridasan* 3397.

Photinia integrifolia Lindl. (R) (ROSACEAE)

Trees; Himalayas, Nepal, Sikkim and Khasi hills; presently found only in Cherrapunji in Khasi hills. *Haridasan* 3394.

Phyllanthus longiflorus Heyne (R) (EUPHORBIACEAE)

Shrubs to herbs; southern India. Recently collected from Balphakram sanctuary, rare. (Rao *et al.* 1981). *Haridasan* 4156.

Pittosporum humile Hk. f. & Th. (EN) (PITTOSPORACEAE)

Shrubs; Khasi hills. We have recorded this from Barapani and Mawlai near Shillong. *Haridasan* 10193.

Polygala tricholopha Chodat (V) (POLYGALACEAE)

Scandent shrubs; Assam, Cachar Hills; extremely rare in Meghalaya and getting drastically reduced; collected only once from the sacred forests of Mawsmai, which forms the first report after 1931 (Haridasan *et al.* 1981) *Haridasan* 5959.

Porana racemosa Roxb. (R) (CONVOLVULACEAE)

Climbers; Assam, Andamans and Eastern Peninsula. In Meghalaya very rare and found only in Shillong peak and Raliang. *Haridasan* 3390.

Rhododendron formosum Wall. (R) (ERICACEAE)

Ornamental shrubs; Bhutan and Khasi hills; very rare in truly wild condition in Meghalaya; only once collected near Jakrem. *Haridasan* 4184.

Salix tetrasperma Roxb. (V) (SALICACEAE)

Trees; Himalayas, Assam and eastwards to Java; now very rare and only a few isolated trees were seen in Khasi hills. *Haridasan* 3395.

Schima khasiana Dyer (R) (THEACEAE)

Trees; Khasi hills; now found only in Shillong peak, Mawphlang and Sohrarim. *Haridasan* 4277.

Schizandra neglecta Sm. (R) (SCHIZANDRACEAE)

Climbers; Temperate Himalayas, Sikkim and Khasi hills; now extremely rare in Khasi hills and we have located only a few plants in Upper Shillong. *Haridasan* 4274.

Sophora acuminata Benth. ex Baker (R) (FABACEAE)

Shrubs; Bangladesh, Eastern Himalayas, Khasi hills and Assam. We have recorded this plant only from the sacred forests at Mawsmai, where only a few plants were noticed. *Haridasan* 4663.

Strobilanthes acrocephalus T. Anders. (R) (ACANTHACEAE)

Herbs reported from Khasi hills; we have recorded this only from Shillong *Haridasan* 2793.

Strophanthus wallichii A. DC. (R) (APOCYNACEAE)

Climbing shrubs; Khasi hills, Chittagong, Burma. In Meghalaya, now extremely rare and collected only once from Lailad, Khasi hills, where a solitary plant was noticed. *Haridasan* 5289.

Stylidium kunthii Wall. ex Cl. (R) (STYLIDIACEAE)

Herbs; Bangladesh, Burma, Sikkim and Khasi hills; a recent report (Haridasan *et al.* op. cit.) from Garo hills is the only collection after about 100 years from this region. *Haridasan* 4108.

Thunbergia coccinea Wall. (R) (ACANTHACEAE)

Climbers; Himalayas, Bhutan, Assam and Khasi hills. We have collected this only from the sacred forests at Mawsmai. *Haridasan* 2398.

Tupidanthus calyptratus Hk. f. & Th. (R) (ARALIACEAE)

Shrubs; Khasi hills; we have not been able to record this from Khasi hills. Our only collection is from Balphakram in Garo hills. *Haridasan* 2738.

Ulmus lanceifolia Roxb. (V) (ULMACEAE)

Trees; sub-tropical Himalayas, Sikkim, Khasi hills and eastwards to Burma; during our studies we have recorded this only from Lailad in Khasi hills. *Haridasan* 10224.

Unona longiflora Roxb. (V) (ANNONACEAE)

Scandent shrubs; Assam, Khasi hills and Chittagong; now confined to Tura peak (Garo hills) and Nongkyllem reserve forest in Khasi hills. *Haridasan* 10257.

Uvaria hamiltonii Hk. f. & Th. (V) (ANNONACEAE)

Climbers; Sikkim, Bihar, Orissa and Assam. The population of this species is decreasing rapidly; collected only once from Rongrengiri forest in Garo hills. *Haridasan* 5266.

Uvaria lurida Hk. f. & Th. (V) (ANNONACEAE)

Another rare climber in the state; only recorded once from Balphakram in Garo hills. *Haridasan* 10098.

Xylia dolabriformis Benth. (R) (MIMOSACEAE)

Trees; Western Peninsula, Burma and Singapore; extremely rare in Meghalaya and confined to Nongkyllem reserve forest in Khasi hills. *Haridasan* 10209.

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